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A comparison between projected slides and wall map for teaching geographical concepts.

Fred John Pula
University of Massachusetts Amherst

A COMPARISON BETWEEN PROJECTED SLIDES AND WALL MAP FOR TEACHING GEOGRAPHICAL CONCEPTS

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A Comparison Between Projected Slides and Wall Map for Teaching Geographical Concepts

by

Fred John Pula

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INTRODUCTION

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The twentieth century has been characterized by striking changes in methods of education. Instruction in the basic disciplines gave way early to extreme "permissiveness". Educational methodology, now, seems to be moving toward a mid-point between these two extremes, combining what many educators deem to be the best features of both. The trend towards mass education and acceptance of the concept of equality of opportunity in education have resulted in school curricula tailored for the interests of all rather than for just the college-bound.

An outstanding development has been the use in the classroom of the new media of instruction; these include motion picture films, television, filmstrips, slides, projectuals, pictorial illustrations, radio, recordings, graphic materials, three dimensional objects and teaching machines. The effectiveness of these media has been tested and evaluated in approximately 2500 research studies since 1919. Most of the studies are concerned with motion pictures and television -- the most expensive -- whereas the effectiveness of the inexpensive media, such as posters and slides, has received comparatively little attention.

Among the newer and untested media is the projectual

and the overhead projector. School administrators and experimenting teachers are attracted by the teaching possibilities inherent in the use of this device and technique of presentation:

1. The teacher can present her own work.
   No special skills are required to operate the projector. Any member of the class can use the projector to work out a problem or offer a suggestion.

2. The projector is positioned in front of the class.
   The teacher always faces the class, maintaining eye contact at all times. The teacher can observe reactions and adjust the presentation accordingly.

3. Bright images are projected in fully-lighted rooms.
   There is no need to darken the room with the resultant effect that that has on class alertness. The pupils and the teacher are fully visible to each other, at all times. It is not necessary to keep an image on the screen, or to turn the lights on and off, as with projection in a darkened room.

4. The projector allows the teacher great flexibility in the manner of presentation.
   The teacher can draw or write directly on the stage of the projector in much the same way that she would use the chalk board. The teacher can project transparent objects, animated devices, or fluids. The teacher can use slides or projectuals composed of sheets of film, unmasking them for progressive disclosure, or building them up to form composite images.

5. Effective projectuals can be home-made or locally-produced.
   The large size, 7½" x 10", simplifies the preparation of art work. In many cases, photographic reduction of original art

> work is not necessary for making projectuals directly. Rudimentary art skills can produce dramatic, professional looking projectuals. Color can be used effectively and economically. The projection of large, simply drawn illustrations guarantees readability and understanding anywhere in the classroom.

Yet there are few experimental studies to support or dispute the claims of the enthusiasts advocating the use of the overhead projector in the classroom.

The inherent values of any new media lie not in the machines themselves but in the programs that are designed to be used with them. The methods of teaching and the introduction of visual materials must be integrated with the regular subject matter presentation in order to gain the greatest advantage from a particular visual tool.

The haphazard showing of a motion picture, for example, has limited value as a stimulus to learning. Yet, if the teacher previews the film, alerts the class as to what to look for, integrates the new information into the subject matter currently being studied, shows the movie under optimum viewing conditions, discusses the subject matter, and tests the group for understanding, then considerable instructional value is obtained from the material being used.[1] The same approach is recommended for using any visual

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[1]. Wittich, Walter, and Fowlkes, John, Audio-Visual Paths to Learning, Harper, New York, 1946, pp. 29-30.

materials in the classroom.

It is the purpose of this paper first to review the limited studies and literature leading to the use of projectual slides; secondly, to make recommendations as to the need for further research in this area; thirdly, to report on a research study conducted on the use of overhead projection slides in teaching basic geographical concepts.

This report will deal primarily with projected visual materials - their development, value, and effective use in the classroom as contrasted with other techniques of teaching. Reference is made to the early use of non-projected visual materials only to provide background for this study.

Historical Use of the Overhead Projector

Weber in his classic studies in 1921[2] demonstrated that learning and retention were improved markedly through the use of pictures in classroom instruction. Following the publication of this report, interest in this subject matter became heightened. Research into the value of pictorialization and visualization in the classroom was intensified.

Rulon's Study (1933) included an evaluation of long time retention also. His findings indicated that students

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2. Weber, Joseph, Comparative Effectiveness of Some Visual Aids in Seventh Grade Instruction, Columbia University, 1921.

not only learned faster from films but also retained more information longer.[3] Smith (1949) replicated this study and added the fact that persons of high intelligence learned more from films than those of medium or low intelligence.[4] Brandt (1945) through the study of eye movements and fixations recommended the placement of important data in the left-center of an illustration.[5]

Ash demonstrated that training could be accelerated through extended use of films and pictorial presentations without loss of learning.[6]

Instructional techniques were refined and adapted for use with the new visual media. Wittich and Fowlkes in their experiments proved that teacher introductions to films produced more significant increases in learning from such films than if they were shown without introduction or

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3. Hulon, Philip J., The Sound Motion Picture in Science Teaching, Harvard University Press, Cambridge, 1933, p. 98.

4. Smith, Herbert A., "The Relationship Between Intelligence and the Learning Which Results from the Use of Educational Sound Motion Pictures," Journal of Educational Research, 43: 241-44, 1949.

5. Brandt, Herman F., "The Psychology of Seeing", Philosophical Library, 1949, p. 5.

6. Ash, Philip, "The Relative Effectiveness of Massed Versus Spaced Film Presentation", Technical Report SDC 268-7-3, Special Devices Center, 1949, p. 79.

class preparation.[7] The University of Illinois compiled an impressive review of studies testifying to the value of using pictures and graphic aids in stimulating interest in learning on the part of students.[8] The inclusion of motivation and participation questions in visual presentations showed superior informational gains according to a study conducted by Yale University.[9] The significant work of Spaulding on the use of visuals in classroom presentations added to the mounting evidence testifying to the increased learning and retention possible through the visual approach.[10]

Despite the research evidence supporting the use of visual presentations, teachers were slow to use anything more than the most rudimentary techniques. Some of the basic reasons for this apathy given were: lack of familiarity with the complex equipment (especially motion picture projectors); need for special room-darkening facilities; scheduling difficulties; expense of materials and equipment;

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7. Wittich and Fowlkes, op. cit., pp. 29-30.

8. University of Illinois, Division of Communications, "How Pictures and Graphs Aid Learning From Prints: A Review of the Research Evidence", University of Illinois, 1952, p. 29.

9. Yale University Motion Picture Research Project, "Do Motivation and Participation Questions Increase Learning?", Education Screen. 256, 1947.

10. Spaulding, Seth, "Communication Potential of Pictorial Illustration", Audio-Visual Communication Review, 4: 31-46, 1956.

lack of teacher training in the construction and use of visuals of all kinds; and, of course, the built-in inertia in our educational system.

One of the newest projection devices, the overhead projector, has provided a solution to many of the problems listed above. It seems to have unusual advantages. It is simple and easy to use and accepted by even those teachers averse to any mechanical devices in the classroom. It can be operated in a normally-lighted classroom without need for special room-darkening facilities. The permanent installation of the overhead projector in the classroom obviates the need of moving the unit from room to room and scheduling its use. The cost of projectuals[11] used with the projector can be adjusted to the budget of the individual school system. Teachers, with a minimum of instruction, are able to conceive and construct their own visual materials adapted to their own method of presentation. Most important of all, the teacher takes an active part in the visual presentation. The teacher can control the rate of presentation, adjusting the pace according to the "feedback" or reaction of the class. This is possible because the teacher can maintain eye-contact with the pupils during the use of the projector. The presentation can be adjusted

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11. "Projectual" is a new term denoting a large slide or transparency used on the overhead projector. Its size varies, but the most common size is 8" x 10".

to meet the response of the viewers: the sequence of slides can be altered, and previously-viewed slides can be shown without delay or inconvenience. The teacher has complete control over the presentation.

The first use of the overhead projector was for the purpose of projecting bowling scores. This was on the West Coast in the 1930's. World War II saw its use extended to the classrooms of the various training centers of the armed services. Although its popularity with the service personnel continued to increase even after the Korean War, its acceptance by private industry and by education was extremely slow. The passage of the National Defense Education Act in 1950, together with the aggressive sales efforts of dealers in overhead projectors, have stimulated an ever increasing interest in the various uses of the "overhead" in the school room.

The armed services, with a tremendous training and education task to perform, applied the findings of many basic research studies in developing their use of the overhead projector.

A number of educators have recognized these advantages of the overhead projector and have altered their methods of presentation accordingly.

Biasex at Newton High School found the overhead projector an integral part of his application of the Trump

plan for large group presentation.[12] McGowan, at the Archbishop Stepinac School in White Plains, reported that his pupils appreciated being able, finally, to see laboratory experiments -- all of them performed on the overhead.[13] Instructors at West Point, which has an unusual ratio of instructors to students in its academic program -- 11 to 15 students per class, recommended highly the use of the overhead and other visual media in its presentation of material.[14]

Some research studies were conducted on the effectiveness of the overhead projector. They confirmed its enthusiastic acceptance by the teachers and schools noted above. Neely, working on a National Science Foundation grant at Kansas State University, found little increase in retention or learning through the use of the projector in teaching Geometric Constructions to college groups.[15] He noted a

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12. Bissex, Henry, "How Overhead Projection Aids Large Group Instruction", Educational Screen, 37: 230-1, May 1958.

13. McGowan, Reverend Laurence J., Applications of the Overhead Projector to the Teaching of Chemistry, Archbishop Stepinac High School, White Plains, New York, p. 19.

14. Keeley, Captain John B., "AV at West Point", Educational Screen and Audio-Visual Guide, October 1960, pp. 544-7.

15. Neely, H. H., Design & Development of Transparent Overlay Visual Aids for Teaching Basic Principles of Engineering Graphics, Kansas State University, Manhattan, Kansas, NSF, Grant G9291, p. 48.

marked improvement in teaching methods and classroom efficiency.

Chance, working in a similar subject area, also reported little improvement in recall but improvement in student attentiveness, more professional presentation, more time for student participation in classwork.[16]

Church, in a progress report of a current study, stated that the use of the overhead projector in teaching junior high school mathematics and science resulted in an increase in the amount and rate of learning. Further, more subject matter was presented per unit of time than through convontional methods.[17]

Little has been done on the elementary level to test the effectiveness of teaching with the overhead. Lalime has described its use with the team-teaching approach at Norwalk, Connecticut. But no formal evaluation, as yet, is available.[18]

Need for Research in the Use of the Overhead Projector

The overhead projector is gradually gaining acceptance

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16. Chance, Clayton W., Experimentation in Adaption of the Overhead Projector in Teaching Engineering Descriptive Geometry Curricula, report presented at NEA Convention, April 25, 1961.

17. Church, John G., A Study of the Effectiveness of Communications Media in Improving Science and Mathematics Instruction, unpublished report, Albany, New York, 1961.

18. Lalime, A., "Teamwork Produces Audio-Visual Techniques", Grade Teacher, 77: 55-72, June 1960.

as a teaching tool in American education. At the 1962 conference of the National Association of Secondary School Principals held in Atlantic City, ten manufacturers displayed their models of projectors. The numerous suppliers of projectuals received many requests for information and materials. These same suppliers received only passing notice as recently as two years ago. Teachers and administrators are entering this area of visual presentation, unfortunately, with little regard as to how it can best be adapted to their peculiar teaching needs and methods. The projector is most often used in rudimentary fashion. Its full potential as a device for improving learning is not explored.

Allen recently deplored the emphasis of research on testing the effectiveness of television, teaching machines, and language laboratories at the expense of the tools more directly subject to the control of the individual teacher. He asserted more emphasis should be placed on testing the learning and retention possible through the use of inexpensive, locally-prepared materials such as bulletin boards, flat pictures, slides, and displays. Included in this list was the use of the overhead projector and the making of projectuals.[19]

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19. Allen, William H., "Research on Film Use", Audio-Visual Communication Review, Summer 1955.

Most teachers give verbal support to the instructional value of pictures in the classroom, but their methods of teaching do not reflect a strong conviction on this matter; nor is there a guarantee that visuals will add to most learning situations. Each subject, every teaching unit, calls for different methods of illustration. Only through systematic research can these be identified and certain basic principles determined.

The reports of users of the overhead are filled with enthusiasm. Hansen, teaching introductory material on sets and Venn diagrams in his mathematics classes in Minneapolis, believes implicitly in the value of the "overhead" because of the multisensory approach to communicating these abstract concepts.[20] First-graders in the Marlboro Elementary School in Maryland learned the principles of good art through drawing on the overhead, according to their teachers.[21] Such observations, however, failed to measure the actual improvement in learning. Nor did they guarantee that students in Little Rock or Boston will achieve the same results.

Careful systematic studies are needed in all the

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20. Hansen, V. P., "New Uses for the Overhead Projector", The Mathematics Teacher, 53: 467-9, p. 60.

21. "Mrs. Burrough's Magic Pencil", Audio-Visual Instruction, Vol. 7, No. 4, pp. 222-23, April 1962.

subject areas to determine where and how the overhead projector can be used for maximum effectiveness in visually communicating ideas and concepts. The most recent report of research projects under Title VII of the National Defense Education Act described thirty-six studies - none concerned with overhead projection.[22] This study is designed to help fill that need by analyzing a single teaching concept, and through careful observation and measurement, to test for one specific advantage in the use of the overhead projector - namely clarity and simplicity of image presented to the student. The study will try to determine if simple, uncluttered, locally-produced, colored projectuals can be as instructive as commercially prepared visual materials. It will not consider the other possible advantages, such as provision for discussions, nor will it argue the pros and cons of school-made materials versus commercially-prepared materials. Comparative costs and storage of materials were not considered and are not a part of this study.

Purposes and Objectives of the Research Study

In determining a subject area that would lend itself to an objective study of the use of overhead projection,

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22. News and Reports: Title VII-New Educational Media, U. S. Department of Health, Education and Welfare, Office of Education, July 1962.

several criteria were kept in mind: (1.) The subject matter should lend itself readily to visualization; the concepts should not be too abstract and should be understandable at an elementary level. (2.) A comparison should be made with current teaching techniques, if possible using visuals in some form. (3.) It should be an interesting new area of research which would make a definite contribution to the methodology of teaching.

Teaching a basic understanding of maps was chosen as the area of study. It fitted the criteria enumerated above; also considered were its implications for teaching students America's leading role in the world today. Colby describes the importance of map-teaching in the following excerpt:

> "Recent times have witnessed the spread of American operations into most parts of the world ... We desperately need world knowledge which we do not command. In a search for knowledge old maps have been studied, new maps made, and accurate information sought as our government has faced major decisions with regard to foreign areas and international questions. In spite of great effort and huge expenditures we are still geographically illiterate with regard to much of the world. This is an educational challenge of the first magnitude. The solution lies in a vigorous study of geography at all levels of education -- study illuminated and enriched by the use of more and better maps".[23]

Maps and globes are currently being used. Each

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23. Colby, C. C., and Odell, C. B., "Successful Teaching With Maps", Benoyer-Geppert and Company, Chicago, 1954, p. 5.

classroom is usually equipped with a portable globe and one or more wall maps, the detail varying with the grade level. The value of these devices in clearly portraying the concepts for which they are designed is questionable. The challenge is made on the grounds that the wall maps and globes are comparatively expensive. As a result, there is a tendency to clutter them with type, colors, topographic features, and symbols. On the other hand, since projectuals are inexpensive and can be locally-produced, these same map concepts could be set forth in a clearer, simpler fashion.

The purpose of this study, therefore, is to compare the effectiveness of locally-produced projectuals on the overhead projector with a traditional and current, commercial wall map in teaching basic geographical concepts. Selected for this purpose was Cram's Geographical Terms Map. Several projectuals were constructed to present the same information. It was decided to work on the fourth-grade level.

CHAPTER II

OUTLINE OF PROCEDURE

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The approach to this study, stated simply, was as follows:

1. Selection of basic geographical terms.
2. Pre-testing fourth grade students to determine their level of understanding and the equivalence of the groups.
3. Presentation of a lesson illustrated in part by wall map and in part by overhead projector.
4. Post-tests.
5. Evaluation.

Selection of Geographical Terms

A survey was made in four school systems to determine the nature of basic geographical concepts taught to youngsters on the fourth and fifth grade level. Also studied were the recommendations of various leaders in the area of map studies.[1] As a result of this survey, a list of forty-seven terms was selected (See Appendix). Several of these would be familiar to the students, but the understanding of most of these would represent a new level of achievement.

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1. "Suggested sequence for Globe and Map Skills -- Grades 1-6", Service Publication #Ma44, Denoyer-Geppert Company, Chicago, January 1956.

"Maps, An Action Program", With World Book Encyclopedia, 3A 2064, Chicago, 1961.

The lesson was to be given in early March, 1962 as part of the students' regular program of study.

Preparation of Groups and Pre-testing

In the selection of groups of students, no attention was given to their backgrounds, IQ's, or other differences. The only determination made was their prior knowledge of the subject matter to be presented. The reasons for this will be explained in the Procedure. A randomized approach was used whereby the same students were presented parts of the lesson illustrated by reference to the wall map and other parts illustrated by projectuals. By comparing the scores of the groups on the individual parts of the test a random sampling was achieved. All groups were previously exposed to the use of wall maps and the overhead projector to remove any bias as to the method used. For the same reason, the teachers were fully instructed in the use of the overhead, where instruction was necessary, and had ample opportunity to present other material with the overhead projector, unrelated to this study, to their classes.

The pre-test contained thirty-nine items, and it was given just before the start of the lesson. The youngsters required about fifteen minutes to complete the test. Each item was a geographical term to be located in one of four regions. The following are a few of the items: (Complete list in the Appendix, page 48).

	Mountain Area	On or Next to the Ocean	Surrounded by or a part of Ocean	Dry, Rocky Land
5. butte	( )	( )	( )	( )
6. hill	( )	( )	( )	( )
7. bight	( )	( )	( )	( )
8. mesa	( )	( )	( )	( )
9. cape	( )	( )	( )	( )
10. passage	( )	( )	( )	( )

There was no discussion of the results of the pre-test with the class. The teacher did, however, use the pre-test as a motivating device for capturing the interest of the pupils for the lesson that followed immediately.

It should be noted there were four categories of responses representing four groupings of terms. These groupings were important because it was by comparing the level of achievement in each of these parts on the post-tests that the relative effectiveness of the projectuals and the wall maps was determined. This is explained below.

Presentation of the Lesson and Pre-Test (A)

A twelve minute lesson defining and illustrating these forty-seven basic geographical terms was prepared and tape-recorded. It was hoped that tape-recording the lesson would minimize the teacher variable. The presentation of the lesson would not be affected by individual teacher's

likes or dislikes of the subject matter. The lesson was divided into four parts. These divisions were known to the experimenter but were not obvious to the students hearing the lesson.

The tape-recorded lesson was illustrated by either the wall map or a specially constructed set of overhead projectuals (slides) in a sequence determined by the experimenter. The wall map used was Cram's Geographical Terms. The projectuals were designed by the experimenter.

TABLE 1

RANDOM ASSIGNMENT OF VISUALS FOR THE FOUR-PART LESSON PRESENTED TO SIX TEST-GROUPS

Group	Part I	Part II	Part III	Part IV
A	OH*	WM*	OH	WM
B	WM	OH	WM	OH
C	OH	WM	WM	OH
D	WM	OH	OH	WM
E	OH	OH	WM	WM
F	WM	WM	OH	OH

* OH signifies the use of the overhead projector, and WM signifies the use of the wall map in the various parts of the test.

A total of six groups or classes of fourth-grade students took part in the study. Table 1 indicates the random assignment of visuals that was made for the four-part lesson presented to the groups. For example, with Group A, the first and third parts of the lesson on basic geographic terms were illustrated by the use of visuals on the overhead projector; the second and fourth parts were illustrated by reference to the wall map. This method of visualization was reversed when the same lesson was presented to Group B. When presented to Group C, the first and fourth parts were visualized on the overhead projector and the second and third parts by reference to the wall map. This was reversed again for Group D. Group E was exposed to the use of the overhead projector in Parts I and II; and the wall map in Parts III and IV. Group F again reversed the procedure.

None of the six groups had the same order of visual usage in the presentation of the lesson. The verbal presentation was the same for each group. This arrangement allowed for a comparison of effectiveness of visual techniques within a group, as well as between groups. The identity of the parts was maintained throughout: - in the pre-test, the lesson, and the post-tests. As a result, Group A's response to Part I could be compared with its

response to Part II or with Group B's response to Part I. These comparisons could be continued to determine any significant differences resulting from the use of the visual material.

The regular classroom teacher conducted the lesson and the testing. After the pre-test, the lesson was introduced, the tape-recorder started and the lesson begun (See Appendix for text of lesson). With Group A, the teacher pointed out on the projectual each of the terms described in Part I. As Part II started, the teacher turned off the projector, drew down the wall map, and pointed out the areas described on the wall map. Each teacher had a script and rehearsed the order of presentation before the class meeting. The teacher, for Part III, rolled up the wall map, and returned to the projector. Then back to the wall map for Part IV. This procedure was followed, according to the assigned sequence, for each of the six groups.

There was no discussion of the terms after the lesson was completed.

Multiple-Choice Test (B)

Immediately on completion of the lesson, a forty-four item multiple-choice test was given. The test was again divided into four parts, the divisions known only to the experimenter. Items such as the following were included:

(See the Appendix for the complete test, p.).

3. A wide area of grassy land is called a (an)

( ) archipelago ( ) fissure ( ) prairie

( ) peninsula

10. A highland is an area in

( ) a passage ( ) an atoll ( ) the mountains

( ) the prairie

15. A point of land jutting into the ocean is sometimes called a (an)

( ) isthmus ( ) cape ( ) iceberg ( ) basin

27. An island made of coral is called a (an)

( ) archipelago ( ) atoll ( ) chasm

( ) lagoon

Map Test (C)

Two weeks after the lesson, a second post-test was given. This consisted of matching the numbers on two maps with a list of the geographical terms. The maps were similar to the ones used in the lesson but, of course, were not labelled except for the numbers. (See Appendix for maps and terms, p. 60).

Post-Test (D)

Three weeks after the lesson, a final post-test was given to each group. It was actually a repeat of the initial test, the pre-test. This was designed to measure any change in the understanding of the terms using the same

testing instrument.

In summary, there was a total of four tests given to each group: (1) the Pre-Test (A), to determine the level of understanding of the terms; (2) the Immediate Post-Test or Multiple-Choice Test (B) to measure any immediate gain in understanding of the terms and to note any variations between parts and groups; (3) the Gap Test (C), two weeks later, a matching test; (4) the Post-Test (D), three weeks later -- a repeat of the Pre-Test. Throughout the lesson and the testing, the results of each of the four parts were noted, totaled, and the means for each compared.

CHAPTER III

ANALYSIS OF TEST RESULTS

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Pre-Test (A)

A multiple-definition test was given at the start of the study to all participating students. This was to determine their knowledge of the forty-seven geographical terms used in the experiment. Pre-Test (A) was divided into four parts as were the other three tests. The number of items in each part was not equal. Therefore, there was a difference in total responses and the means of these responses between the various parts, even for the same individual. Table 2 lists the items for each part in the pre-test:

TABLE 2

NUMBER OF ITEMS IN EACH PART OF PRE-TEST (A)

Part	No. of Items
I	13
II	6
III	9
IV	7
Total	35

TABLE 3

COMPARISON OF MEANS OF THE FOUR PARTS IN PRE-TEST
(A) FOR ALL GROUPS

Group	N	I	II	III	IV
A	25	[redacted]	2.44	[redacted]	2.44
B	23	5.39	[redacted]	1.30	[redacted]
C	23	[redacted]	2.83	2.91	[redacted]
D	23	6.48	[redacted]	[redacted]	2.39
E	19	[redacted]	[redacted]	3.05	2.26
F	34	6.44	2.21	[redacted]	[redacted]

[redacted] Identifies Overhead Groups

Table 3 compares the means of the four parts for all the six groups taking part in this experiment. The average response of Group A, typical of all the groups, was 7.7, 2.4, 2.6, and 2.4; the sum of the means for the four parts was 15.20 compared with a perfect score of 35. From these figures, it was evident that there was some understanding of the terms being used but many of the terms were still strange or unknown to the groups.

The overhead projector and the wall map were not used yet. The parts were identified with this designation only to determine if the overhead and wall map sections were equal in their basic understanding of the geographical terms being used in the lesson. Note in Table 3, that the means of all groups in each part were quite close for both the overhead and wall map. The greatest difference lies in Part I with the Overhead group seeming to have an advantage over the Wall Map group.

Table 4, on the page following, shows the mean and standard deviation for each part of Pre-Test (A) for the total groups exposed to the use of the overhead projector and wall map during the presentation of the lesson. The total average response for Part I was much higher than for the other parts, dealing as it does with more familiar terms such as plain, prairie, lowland, mountains, hills. Most groups had difficulty with Part III which considered such terms as bight, passage, archipelago, coral reef, bay, gulf, strait, atoll and island.

There was no set pattern in the dispersion of scores from the mean. The Overhead sections in Part I averaged 7.94 with a standard deviation of 1.90; in the same part, the Wall Map sections averaged lower, 6.18 but had a greater dispersion, 2.30. This relationship between the mean and standard deviation held true in Parts II, III,

TABLE 4

THE MEAN AND STANDARD DEVIATION OF EACH PART OF PRE-TEST (A) FOR THE TOTAL GROUPS EXPOSED TO THE USE OF OVERHEAD PROJECTION AND THE WALL MAP

	I		II		III		IV		Total	
	OH	WM	OH	WM	OH	WM	OH	WM	OH	WM
N	82	65	67	80	65	82	80	67	294	294
$\bar{X}$	7.94	6.18	2.27	2.20	2.38	2.53	1.98	2.28	7.05	6.39
Sd	1.90	2.30	1.07	1.20	1.41	1.29	1.32	1.34	3.57	2.78

and IV.

Comparing the overall performance of the Overhead group with the Wall Map group, the experimental, or Overhead group had a slight, initial advantage, mainly due to the effect of Part I. This difference will have to be taken into account when analyzing the results of the following tests.

Multiple-Choice Test (B)

The immediate post-test, given directly after the lesson, was multiple-choice. Again the test was in four parts. Table 5 shows the division of the total number of forty-four items. Note that the number of items in each part varies.

TABLE 5

NUMBER OF ITEMS IN EACH PART OF PRE-TEST (B)

Part	No. of Items
I	12
II	8
III	11
IV	13
Total	44

Table 6 presents the means of the responses for each group in each part of the multiple-choice test. For purposes of comparison there are three pairs of groups, and the individuals in the pairs can be studied on that basis. Group A can be compared to Group B, Group C to Group D, and Group E to Group F. The experiment was set up to reverse the methods of presentation in these groups to make this analysis possible. It can be seen that Group A scored a mean of 7.56 in Part I with the use of the overhead as contrasted with Group B's 7.39 using the wall map. Group C with the overhead in Part III scored 7.61, barely exceeding Group D's score of 7.60. However, in Part IV, Group C

TABLE 6

COMPARISON OF MEANS OF THE FOUR PARTS IN MULTIPLE-CHOICE TEST (B) FOR ALL GROUPS

Group	N	Means I	II	III	IV
A	25	[redacted]	3.88	[redacted]	4.76
B	23	7.39	[redacted]	5.74	[redacted]
C	23	[redacted]	5.04	7.61	[redacted]
D	23	9.30	[redacted]	[redacted]	6.91
E	19	[redacted]	[redacted]	7.84	7.05
F	34	7.44	3.53	[redacted]	[redacted]

using the wall map outscored Group D and the overhead projector 7.35 to 6.91.

This was one method of analysis. It failed to provide any clear-cut evidence in favor of either method of presentation. Table 7, on the page following, indicates that the mean of all OH responses when compared to the mean of all WM responses for Parts I, II, III, IV failed to be statistically significant. This was determined through the use of the t test and the analysis of variance.

In Part I, the Overhead group fell behind the Wall Map group 8.04 to 8.57. This was interesting because the Pre-Test established that the Overhead group was initially more familiar with these terms than was the Wall Map group. On the other hand, Part III showed the Overhead group ahead of the Wall Map group, and with a lower standard deviation; yet, in the Pre-Test, this same group showed less familiarity with the terms than the Wall Map group with a wider dispersion of scores.

The total mean of the Overhead group for the total test was 12.57 as compared to 12.43 for the Wall Map group. The standard deviations indicated a greater concentration of scores around the mean for the Overhead group than for the Wall Map group -- a reversal of the results on the pre-test. The difference between the means of .14 failed to be significantly different.

TABLE 7

THE MEAN AND STANDARD DEVIATION OF EACH PART OF PRE-TEST (B) FOR THE TOTAL GROUPS EXPOSED TO THE USE OF OVERHEAD PROJECTION AND THE WALL MAP

	I		II		III		IV		Total	
	OH	WM	OH	WM	OH	WM	OH	WM	OH	WM
N	82	65	67	80	65	82	80	67	294	294
$\bar{X}$	8.04	8.57	4.91	4.16	2.01	6.28	5.03	6.29	12.57	12.43
Sd	2.25	2.04	1.77	1.80	2.04	2.40	2.39	2.76	3.78	4.74

Map Test (C)

Two weeks after the lesson was presented and the multiple-choice test was given, the groups were tested again for recall and retention. The method employed was geographical area identification, utilizing outline maps and requiring the use of the same geographical terms. This test was also divided into four parts, unknown to the children. The total number of items and the division of items in the various parts is shown in Table 8.

TABLE 8

NUMBER OF ITEMS IN EACH PART OF MAP TEST (C)

Part	No. of Items
I	7
II	7
III	11
IV	13
Total	38

Table 9, on the page following, summarizes the results

of this test. Note that the groups changed their rankings as far as total means were concerned. In this test, Group A scored lowest with a 12.08 while in the pre-test it scored the highest. Group D with the highest score of 22.17 was at the bottom of the array in the pre-test but also the highest in the multiple-choice test.

In comparing the means of the scores for each of the parts in Table 10, which is shown on the page following Table 9, it is evident that the Wall Map groups fared better than did the Overhead Groups. This was true in Parts

TABLE 9

COMPARISON OF MEANS OF THE FOUR PARTS IN MAP TEST (C) FOR ALL GROUPS

Group	N	I	II	III	IV
A	25	[redacted]	2.16	[redacted]	4.16
B	23	2.57	[redacted]	2.73	[redacted]
C	20	[redacted]	3.90	5.85	[redacted]
D	22	4.09	[redacted]	[redacted]	6.77
E	19	[redacted]	[redacted]	4.95	6.47
F	33	3.76	4.18	[redacted]	[redacted]

TABLE 10

THE MEAN AND STANDARD DEVIATION OF EACH PART OF MAP TEST (C) FOR THE TOTAL GROUPS EXPOSED TO THE USE OF OVERHEAD PROJECTION AND THE WALL MAP

	I		II		III		IV		Total	
	OH	WM	OH	WM	OH	WM	OH	WM	OH	WM
N	78	64	66	76	62	80	78	64	284	284
$\bar{X}$	3.47	3.40	3.36	3.92	4.42	4.78	5.39	5.43	8.37	8.78
Sd	1.64	1.63	1.91	1.63	2.62	2.89	2.58	2.77	3.91	3.99

II, III and IV. Only in Part I were the results in favor of the Overhead group -- and then, the difference in the means was .07.

The mean for the total Overhead group was 8.37 and for the total Wall Map group it was 8.78. Standard deviations were 3.91 to 3.99. Although the scores of this test favored the wall map, the differences were not statistically significant. To determine this, the t test was used as well as the analysis of variance.

Post-Test (D)

The Multiple-Choice Test (B) and Map Test (C) produced results that could very well reflect the effect of the instrument or the type of test. Attempting to control this, a repeat of the Pre-Test (A) was given three weeks after the presentation of the lesson. Table 11, on the page following, compares the means of the four parts in Post-Test (D) for all groups.

In studying Table 11, it appears that the Overhead group showed the greater gain. Comparing Groups C and D, for example, the effective use of projectuals is shown through all the parts.

Table 12, on the page following that on which Table 11 appears, indicates that the grand mean for the total Overhead group was 9.09 as contrasted with 7.89 for the Wall Map group. This difference of 1.20 was analyzed. The

TABLE 11

COMPARISON OF MEANS OF THE FOUR PARTS IN POST-TEST (D) FOR ALL GROUPS

Group	N	Means I	II	III	IV
A	25	[redacted]	3.04	[redacted]	3.12
B	23	6.78	[redacted]	2.04	[redacted]
C	23	[redacted]	3.17	3.78	[redacted]
D	21	8.30	[redacted]	[redacted]	4.75
E	9	[redacted]	[redacted]	3.77	5.00
F	32	6.72	2.38	[redacted]	[redacted]

critical ratio was computed to be 2.40. The difference was statistically significant at the 5% level of confidence.

This significant difference must be interpreted with caution since the Overhead groups had a higher score initially on the pre-test (7.05 to 6.39). Employing the statistical method of analysis of co-variance to equate the initial performance of the two groups, it was found that the difference in the adjusted means was not statistically significant.

TABLE 12

THE MEAN AND STANDARD DEVIATION OF EACH PART OF POST-TEST (D) FOR THE TOTAL GROUPS EXPOSED TO THE USE OF OVERHEAD PROJECTION AND THE WALL MAP

	I		II		III		IV		Total	
	OH	WM	OH	WM	OH	WM	OH	WM	OH	WM
N	80	53	55	78	55	78	76	57	266	266
$\bar{X}$	7.58	7.39	3.34	2.79	3.05	2.73	3.26	3.96	9.09	7.89
Sd	2.37	2.63	1.53	1.28	1.75	1.52	2.11	1.61	4.28	3.71

CHAPTER IV

SUMMARY AND CONCLUSIONS

CHAPTER IV

SUMMARY AND CONCLUSIONS

This comparison between the overhead projector and the wall map for teaching basic geographical concepts in the classroom produced no significant difference in learning and retention. There was little to suggest the superiority of the one technique over the other. Though neither method showed any superiority over the other, it is significant that the locally-produced projectuals proved to be as effective as a large commercial wall map. It is for future studies to determine if the comparative costs, ease of use, local production of materials, and room lighting are factors which will predispose teachers to use the overhead projector rather than the wall map for the teaching of geographical concepts.

This study did raise several questions:

1. What other factors were in force here to enable the groups to learn so well from wall maps even though the map could not be comfortably viewed beyond the second row?

2. Perhaps visuals (both wall map and overhead projectuals) played no part in the learning process. Could all the learning have been the result of listening to the tape-recorded lesson? Could the pre-test coupled with the tape recording have proven to be the strong motivational device?

3. Should the teacher have been given a more active part in the experiment?

4. Was a twelve-minute lesson of sufficient length to provide measurable differences in learning and retention? Perhaps a ten or fifteen lesson, or a series of lessons, should be planned, with post-tests conducted as long as a year later?

5. Does the size of the group have any effect on learning and retention in both presentation situations - use of the wall map and use of the overhead projector? Can pupils in a classroom, seating fifty, learn from a wall map or overhead projector as well as pupils in a classroom, seating twenty? Or are there differences?

These are questions that should be considered before other experiments of this type are conducted. The efforts to test learning and retention with visual tools should go on in order to determine the most effective teaching tools for the various subject areas.

There may not have been demonstrated an increase in learning and retention through the use of the overhead projector but there was enthusiastic acceptance of the "overhead" by both teachers and pupils. With such high interest and enthusiasm, it is puzzling that no differences were noticeable in the data. It is possible that the interest in the overhead projector carried over to the wall map presentation -- one sustained the other. It is suggested, again, that future tests should be conducted with separate groups using separate visual tools rather than using the control and experimental techniques with the same group.

APPENDIX

Fred Pula
School of Education
University of Massachusetts

APPENDIX I

Research Study

Comparative Effectiveness of the Wallmap and the Overhead Projector in Teaching Basic Geographical Terms

General Instructions for the Classroom Teacher

This study, as the title indicates, is designed to determine if the overhead projector is a more effective teaching tool than the wallmap in teaching basic geographical terms. The major steps involved in this study are the following: the pre-test, the lesson, the immediate post-test, and the follow-up post-test.

The pre-test is a simple multiple choice grouping of terms. It should establish the level of understanding of the terms to be used in the lesson. The teacher should use it as an instructional device to interest the pupils in the lesson. It should immediately precede the lesson and should take just a few minutes to complete. Specific items should not be discussed.

The attached transcript is the complete text of the lesson. The lesson is tape-recorded. It is the recorded voice that will provide the verbal commentary in this lesson. We recommend that the teacher familiarize herself with this script before the class presentation. Each of the geographical terms defined should be pointed out either on the wallmap or on the projectuals, depending upon the method of illustration determined for each class. The order of presentation of the projectuals is cued into the printed script.

The teachers working with projectuals should letter-in each of the terms discussed, using the grease pencil on clear acetate. At the end of each Part, the acetate sheet can be removed and replaced with the printed sheet of geographical terms. This picture should remain on the screen for a short time in order for the pupils to relate the terms to the area described. The basic materials and equipment in this experiment are:

1 Tape recorder lesson (speed 3 3/4')

1 Tape Recorder

1 Set of projectuals--designed and produced by F. Pula

1 Overhead projector and screen

1 Wallmap (Cramm's Geographical Terms)

The post-test contains a number of multiple-choice items. It should be given immediately after the lessons, and before any class discussion of the terms or the manner of presentation. Pupils should sign their names on the pre-test and post-test.

The follow-up post-test will be given about two weeks after the lesson. It will be a short matching test using map illustrations.

We appreciate the cooperation of the participating teachers. We hope that this study can be accomplished with a minimum disruption of normal scheduled activities.

APPENDIX II

"Geographical Terms" Lesson Presentation Report

1. School:_____
2. Address:_____ _____
3. Teacher:_____4. Grade 4:_____
5. Is teacher experienced in use of overhead projector;_____ basic projectuals;_____complex projectuals;_____use of the grease pencil?_____
6. Were pupils exposed to use of the overhead projector prior to test lesson_____? How many times?_____. Were colored overlays used?_____
7. Method of presentation of text lesson---overhead (OH) or wallmap (WM):

	OH	WM
Part I		
Part II		
Part III		
Part IV		

8. Comments:

APPENDIX III

Name: _____
School: _____
Date: _____

Geographical Terms

Pre-Test (A) and Post-Test (D)

A number of geographical terms are listed below. Place an X in the space provided if the term is best located in one of the following regions:

a. Dry, rocky land

b. Mountain areas

c. On or next to the ocean

d. Surrounded by or a part of the ocean

The first four items have been answered for you to indicate how this test is to be completed.

	Dry, Rocky Land	Mountain Areas	On or Next to the Ocean	Surrounded by or a part of the ocean
1. iceberg	☐	☐	☐	☐
2. delta	☐	☐	☐	☐
3. oasis	☐	☐	☐	☐
4. waterfall	☐	☐	☐	☐
5. butte	☐	☐	☐	☐
6. hill	☐	☐	☐	☐
7. bight	☐	☐	☐	☐
8. mesa	☐	☐	☐	☐
9. cape	☐	☐	☐	☐
10. passage	☐	☐	☐	☐
11. highland	☐	☐	☐	☐
12. archipelago	☐	☐	☐	☐

	Dry, Rocky Land	Mountain Areas	On or Next to the Ocean	Surrounded by or a part of the ocean
13. chasm	☐	☐	☐	☐
14. summit	☐	☐	☐	☐
15. knoll	☐	☐	☐	☐
16. coral reef	☐	☐	☐	☐
17. headland	☐	☐	☐	☐
18. arroyo	☐	☐	☐	☐
19. ridge	☐	☐	☐	☐
20. bay	☐	☐	☐	☐
21. gulf	☐	☐	☐	☐
22. ravine	☐	☐	☐	☐
23. gorge	☐	☐	☐	☐
24. strait	☐	☐	☐	☐
25. slope	☐	☐	☐	☐
26. precipice	☐	☐	☐	☐
27. beach	☐	☐	☐	☐
28. point	☐	☐	☐	☐
29. atoll	☐	☐	☐	☐
30. glacier	☐	☐	☐	☐
31. fissure	☐	☐	☐	☐
32. escarpment	☐	☐	☐	☐
33. peninsula	☐	☐	☐	☐
34. peak	☐	☐	☐	☐
35. isthmus	☐	☐	☐	☐
36. island	☐	☐	☐	☐
37. valley	☐	☐	☐	☐
39. pass	☐	☐	☐	☐

APPENDIX IV

Script for Geographical Terms Presentation

Part I

Your work in Social Studies so far has included some attention to maps. There will be more of this because it is important to locate all of the areas, places, and people that we will meet in our future work. Maps are necessary--whether we are trying to show someone how to reach the nearest skating rink or whether we are tracing the route covered around the globe by the astronaut, Col. Glenn.

Demonstrate with globe

The earth as you know through the study of the globe is made up of land and water--this area land and the blue area water. If we were to take this globe and cut it so that we could spread it out, we could print or draw these lines on a flat piece of paper.

Projectual #1

This is exactly what was done here.

This is a part of this globe flattened out and redrawn with heavier lines and words so that everyone in the class can see it. You can see the water areas and the land areas. The picture maps we will work with were drawn to illustrate certain geographic features found on all maps. They include water areas, dry land, and land receiving a good amount of rainfall.

Overlay #1

The land area in this map is colored green and therefore indicates that there is plenty of rain and water. Note the rivers,/ lakes,/ and ponds. The land in this section is fairly flat. This part is marked prairie which is level or gentle rolling land covered with grass. A similar area but probably receiving more rainfall is a plain. Many of you have heard the word prairie before, and plain.....This area of land, marked lowland is exactly that, low land, when compared to the higher land right here.

Projectual #1
Overlay #2 (words)

These three terms describe land areas that are similar. They are usually flat.

If you look around you outside, you will notice that the land is not all flat. It is very irregular. Map makers try to show this unevenness by drawing certain symbols.

Projectual #1
Overlay #3 (mask)

Let us look closely at this area and identify the features shown.

Projectual #2

A very slight flat rise in the land is shown here. It is called a knoll. A larger knoll, but smaller than a mountain; is a hill; and where we have several hills around the base or bottom of mountains, these are identified as foothills. Mountains are large masses of earth and rock, rising above the common level of the surrounding land, standing either alone or as one of a group or range. The mountains here are very high or tall. The tops are peaks or summits. Some of these are so high that they have snow on them all year round, even on their sides or slopes . A region with many mountains is referred to as a highland; and the upper part, the highest portion is called a ridge. These low regions between the mountains are called valleys. This is where most people live in mountainous country. Food can be grown here, cattle grazed on the slopes of the hills and it's much easier for the people to travel about. I am sure that you can name many mountains, valleys, summits and hills discovered in your own travels or studies in previous lessons.

Projectual #2
Overlay #1 (words)

Part II

Projectual #1
Overlay #4 (mask)

So much for the general land area. Let us consider those points where the land meets or juts into the water. Especially this spot.

Projectual #3

There are some special terms here with which we should become familiar. This piece of land almost completely surrounded by water is a peninsula; where it narrows down to a neck or strip of land connecting to this larger land area we have an isthmus. The very tip here extending into the water beyond the coastline is a cape. Many of you have been to the beach and have

actually been in salt water. Did you know that that area would be shown on the map as a coastline--this line where the water meets the land? The beach had fine sand that was wonderful for making sand castles and forts. Not all the coastline has a sandy beach. This headland is a high piece of land jutting into the sea. There is a sharp drop here down to the water. This is a very steep slope called a cliff. What do you suppose this would be here?

Projectual #3

It looks like a small cape, or headland. And so it is. But there is a special term for this small cape. It is a point of land.

Overlay #1 (words)

So we see that there are special terms for those areas of land that meet the water; the peninsula, isthmus, cape, coastline, beach, headland, cliff and point.

Part III

Projectual #1

All the water here looks the same. If we had samples of the water from these various areas we could not tell them apart. However, map makers have applied special terms to bodies of water depending upon how they meet the land. The largest body of water in the world is the ocean. There are five oceans and I am sure you can name all of them. A Body of water extending from the ocean into the land is known as a gulf. There is one just south of the United States called the Gulf of Mexico. Now there are other terms here dealing with water partially surrounded by land. This bay is really a small gulf, isn't it? And a bight is a bend or small bay between two points of land./ Ocean-going vessels are apt to be unloaded while in a very small body of water that is almost completely sheltered by land. This body of water is called a harbor.

So you can see that even though the water may be the same as far as appearance, it is called an ocean, a gulf, a bay, a bight, or a harbor depending upon how it meets the land.

Projectual #1
Overlay #5 (words)

Projectual #1

no overlays

Here we see smaller areas of land completely surrounded by water. These are islands. The presence of islands in the water give rise to other terms that we should be familiar with. Let's give some attention to this area. Some

Overlay #6 (islands)

islands are formed of soil and rock.

Overlay #7 (mask)

Projectual #4 (islands)

In fact they may be the tops of mountains that are otherwise covered with water. Other islands, especially in the South Pacific are made from the shells of ocean fish. The shells cement themselves together into a hard substance--coral. Coral lying just below the surface of the water is called a coral reef. An island formed from coral, and rising out of the sea is really an atoll. It is usually horshoe-shaped or circular. The body of water inside is a lagoon.

When referring to a group of islands, we speak of them as an archipelago. These are special terms for the water between the islands, and between the islands and the mainland. A passage is a route between islands that can be travelled by a boat. A strait is a narrow body of water connecting two larger bodies of water. This channel is a narrow stretch of water separating two larger areas of land.

Projectual #4
Overlay #1 (words)

It is obvious that water completely surrounding the land creates conditions that need to be identified. That is the reason for the use of these terms: islands, coral reef, atoll, lagoon, passage, strait, channel, and archipelago. That's a hard word, isn't it?

Part IV

Projectual #5

This other map shows certain land features. But it is a drier land--sandy and in some instances very rocky. This is the desert. It is relatively flat and even, except where there may be a slight separation of the rocks. This

overlay illustration of each term.

overlay #1 (words)

fissure sometimes continues to grow either through earthquakes or through the action of water from an occasional rain storm. It becomes a deeper opening in the rock or soil. It becomes a chasm. This chasm can be extended further by running water until now it is an arroyo. As the action of the water continues through the years the arroyo is deepened and widened to a ravine, a gorge, and finally a canyon. You all can name one famous canyon, the Grand Canyon.

Overlay #2
canyon and mountain

You can see the canyons have steep sides or cliffs; another term for this steep side is precipice. As we go up higher in this mountainous region, you will note that the slope of the mountain is not so steep. This is an escarpment--a slope of a mountain, but not as steep as a precipice. There are breaks between mountains that make it easier to travel through them. A pass is such a narrow gap or opening through a range of mountains. As we pointed out earlier, some of these mountains are so high that they have snow on them the whole year round. This snow is packed down so hard that it is formed into a large mass of ice called a glacier. This river of ice flows slowly down the slope of the mountain and is gradually melted as a result of the warmer temperatures.

Overlay #3 (words)

overlay butte, mesa

We won't try to describe and learn all the terms that are illustrated on this map. But it would be interesting to note several others. This high isolated rocky hill rising from the desert floor is a butte. Another high area, but much larger and flatter on the top is the mesa. Note the steep sides and how it also rises up from the surrounding lowlands.

Now these are some of the more important basic geographical terms that you will be using when studying maps. When you see these words or see the geographical symbols or pictures, we hope that you can quickly explain what they are.

Projectuals Used With the Overhead Projector for Presenting the Basic Geographical Terms

The script for the geographical terms presentation in the preceding section noted the use of five projectuals. Copies are included here, printed in the same colors as the originals. To facilitate their binding in this book, the cardboard frame on which all these films were mounted was omitted. The masks on Projectual 1 and 1-A were also left out in order to make easier the viewing of these films.

BIGHT

BAY

GULF

HARBOR

OCEAN

KBK L1

LOWLAND

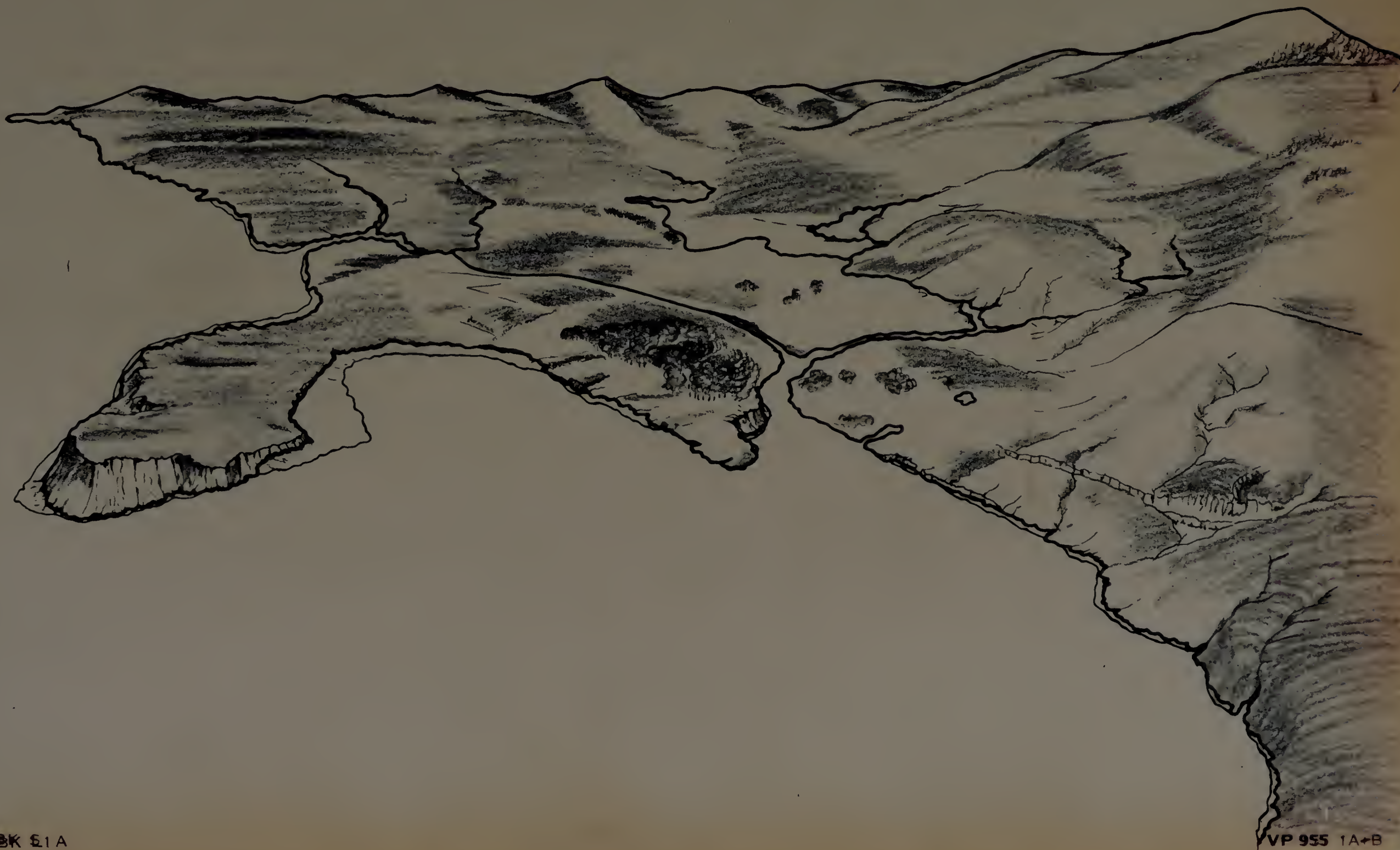
PLAIN

PRAIRIE

KBK L2

Projectual Number 1

VP 955 1A



KBK 1A
S1B

VP 955 1A+B

VP 955 1A•B

PCY S

SUMMIT

PEAK

MOUNTAIN

RIDGE

SLOPE

HIGHLAND

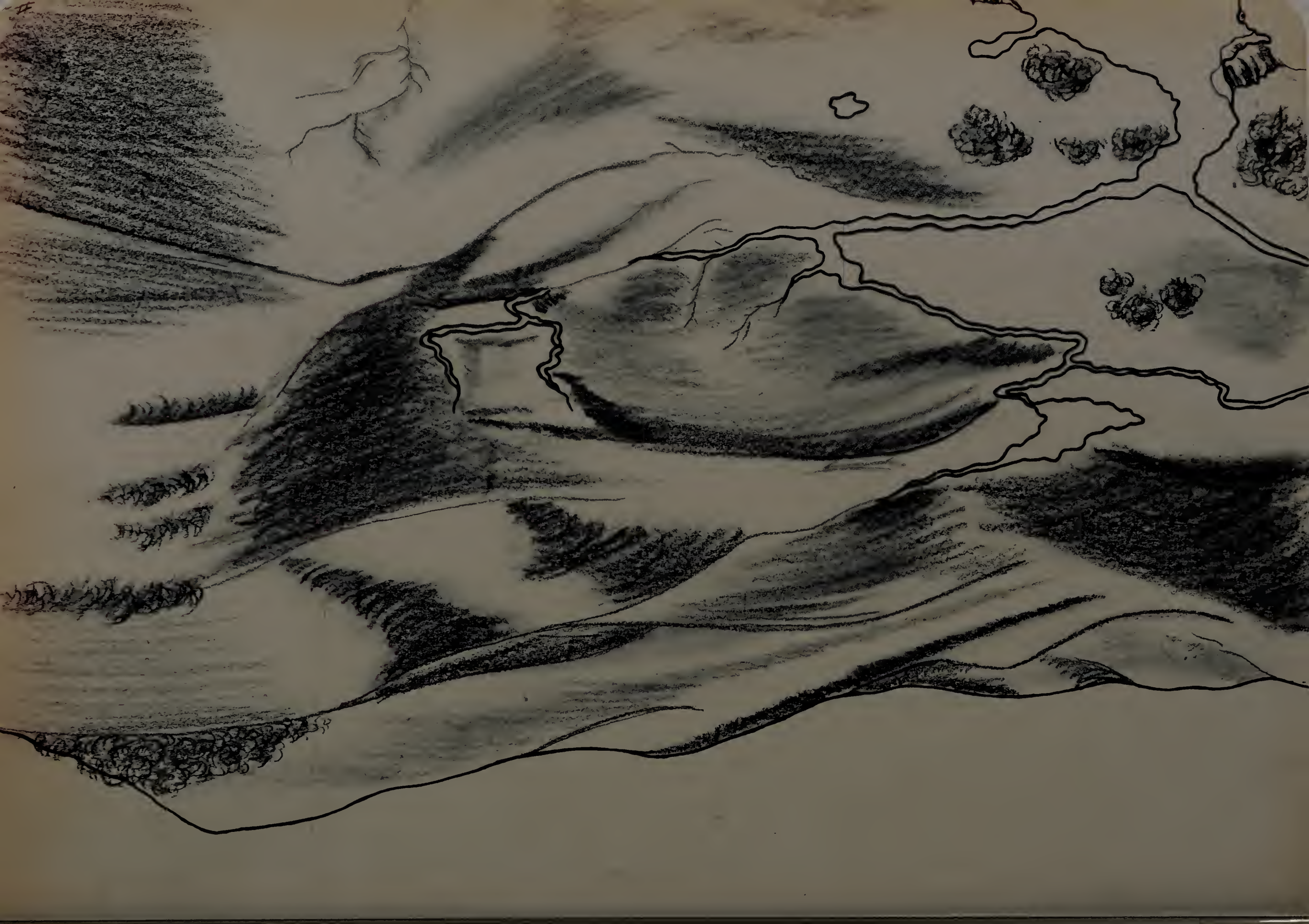
FOOT HILLS

VALLEY

HILL

KNOLL

Projectual Number 2




SUMMIT
PEAK
MOUNTAIN
RIDGE
SLOPE
HIGHLAND
FOOT HILLS
VALLEY
HILL

POINT

ISTHMUS

COASTLINE

PENINSULA

BEACH

HEADLAND

CLIFF

CAPE

Projectual Number 3


ISTHMUS
COASTLINE
PENINSULA
BEACH
HEADLAND
CLIFF

CORAL REEF

LAGOON

ATOLL

STRAIT

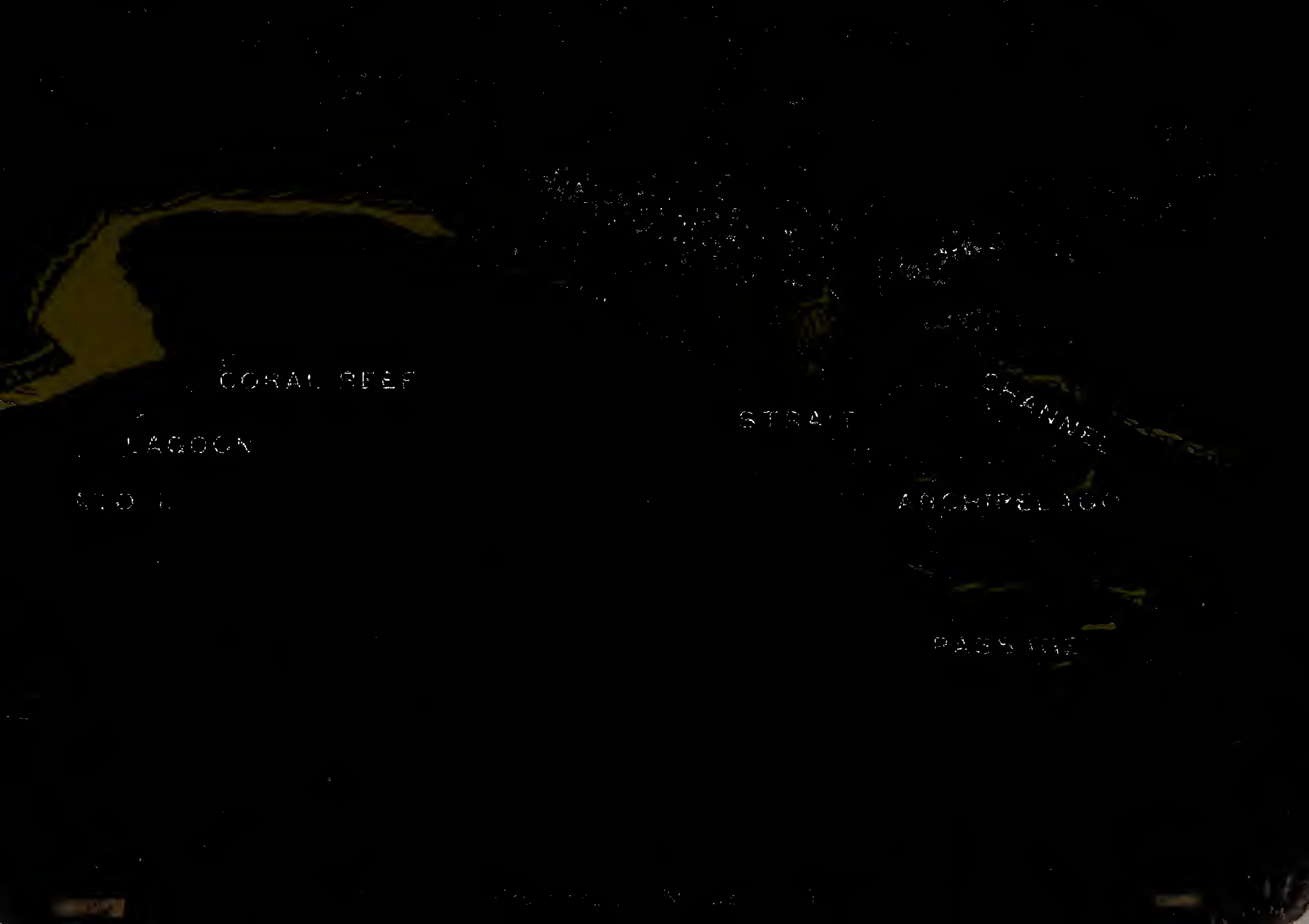
CHANNEL

ARCHIPELAGO

PASSAGE

Projectual Number 4

S 15.7


CORAL REEF
LAGOON
ATOLL
STRAIT
CHANNEL
ARCHIPELAGO
PASSAGE


BUTTE

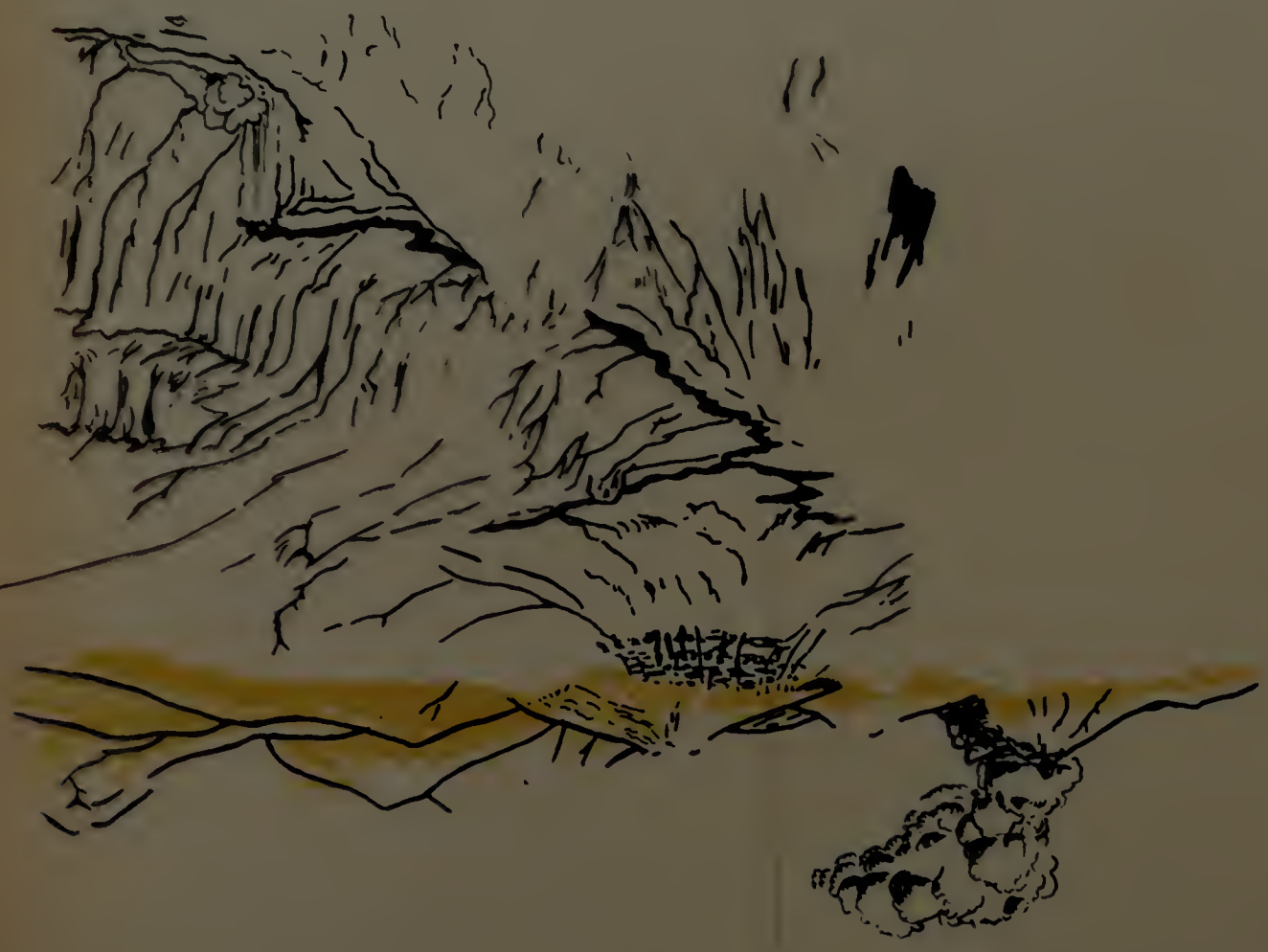

MESA

GLACIER

PASS

ESCARPMENT

PRECIPICE



DESERT

FISSURE

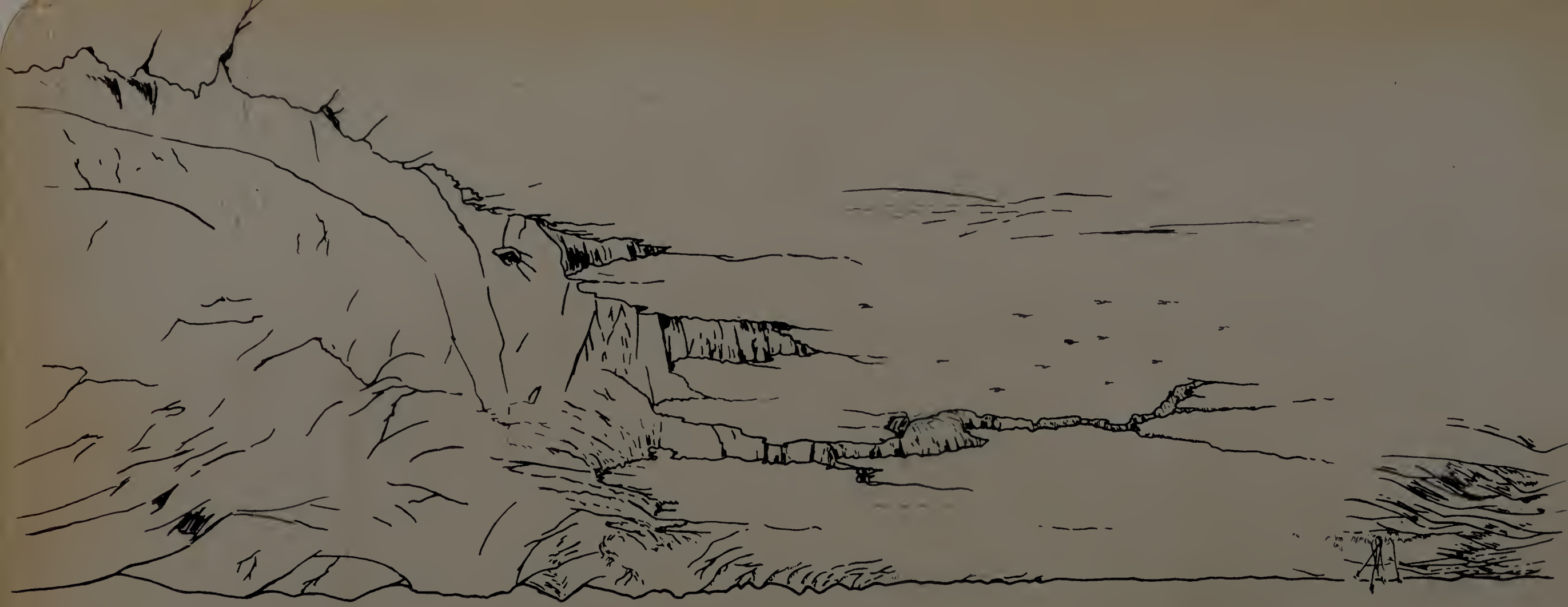
CHASM

RAVINE

GORGE

CANYON

Projectual Number 5



CRAM'S
GEOGRAPHICAL
TERMS

DEFINITIONS OF GEOGRAPHICAL TERMS

APPENDIX VII

Name:
School:
Date:

Geographical Terms

Multiple-Choice Test (B)

Indicate with an (X) the correct answer

1. Flat, lowland areas receiving some rainfall are called
( ) mesas ( ) plains ( ) lakes ( ) pastures

2. A side of a mountain is called its
( ) summit ( ) slope ( ) strait ( ) pass

3. A wide area of grassy land is called a (an)
( ) archipelago ( ) fissure ( ) prairie ( ) peninsula

4. If one climbed to the top of a mountain, he would be on its
( ) highland ( ) ridge ( ) summit ( ) escarpment

5. Which one of the following does not belong with the other three?
( ) prairie ( ) plain ( ) lowland ( ) ridge

6. At the base of mountains we usually find
( ) glaciers ( ) harbors ( ) foothills ( ) ridges

7. Of the following, which is usually highest?
( ) bays ( ) hills ( ) mountains ( ) chasm

8. A high knoll is sometimes called a
( ) coral reef ( ) hill ( ) escarpment ( ) glacier

9. An area between mountains where farms are usually found would be a (an)
( ) valley ( ) oasis ( ) slope ( ) summit

10. A highland is an area in
( ) a passage ( ) an atoll ( ) the mountains ( ) the prairie

11. Which one of the following does not belong with the other three?
( ) archipelago ( ) knoll ( ) island ( ) atoll

12. The highest point on a mountain is called a (an)
( ) peak ( ) pass ( ) precipice ( ) escarpment

13. A narrow strip of land connecting two larger pieces of land is called a (an)
( ) archipelago ( ) canal ( ) isthmus ( ) strait

14. A very large body of water which reaches into the land is called a
( ) gulf ( ) lake ( ) canal ( ) harbor

15. A point of land jutting into the ocean is sometimes called a (an)
( ) isthmus ( ) a cape ( ) an iceberg ( ) a basin

16. A beach is located on a
( ) ridge ( ) prairie ( ) coastline ( ) cliff

17. An area of land nearly surrounded by water but connected to a larger land by a narrow neck is called a (an)
( ) isthmus ( ) peninsula ( ) strait ( ) island

18. You would expect to find which one of the following items on a coastline
( ) bight ( ) prairie ( ) archipelago ( ) plateau

19. A small area of land jutting into the ocean is a
( ) headland ( ) fissure ( ) butte ( ) swamp

20. A point is a small
( ) harbor ( ) valley ( ) isthmus ( ) cape

21. An area of land completely surrounded by water is called a (an)
( ) glacier ( ) iceberg ( ) island ( ) strait

22. A narrow body of water separating two islands is a
( ) bight ( ) gorge ( ) channel ( ) bay

23. The largest body of water is called a (an)
( ) bay ( ) gulf ( ) bight ( ) ocean

24. The part of the ocean which goes into the land is called a (an)
( ) lake ( ) isthmus ( ) strait ( ) bay

25. An island is best described as ( ) the top of a mountain ( ) a floating body of land ( ) the top of an iceberg ( ) a part of a peninsula

26. A passage is very similar to a ( ) coral reef ( ) atoll ( ) channel ( ) isthmus

27. An island made of coral is called a (an) ( ) archipelago ( ) atoll ( ) chasm ( ) lagoon

28. A portion of a body of water so protected as to be place of safety for ships is a ( ) reservoir ( ) bay ( ) harbor ( ) strait

29. A narrow strip of water which connects two large bodies of water is called a ( ) brook ( ) glacier ( ) strait ( ) stream

30. A small body of water almost completely surrounded by an island is a ( ) bight ( ) straight ( ) lagoon ( ) lake

31. An archipelago is a group of ( ) mountains ( ) islands ( ) rivers ( ) harbors

32. A rocky, sandy lowland with little or no rainfall is a (an)
( ) meadow ( ) oasis ( ) desert ( ) pass

33. A precipice is usually located in the ( ) mountains ( ) atolls
( ) lowlands ( ) foothills

34. Which of the following does not really belong with the other three?
( ) ravine ( ) chasm ( ) butte ( ) gorge

35. A fissure could be mistaken for a very small
( ) chasm ( ) canyon ( ) precipice ( ) strait

36. An opening between mountains is called a ( ) glacier ( ) pass
( ) delta ( ) mesa

37. An escarpment is not as steep as a ( ) hill ( ) precipice ( ) knoll
( ) canyon

38. You would probably find a ravine near a ( ) delta ( ) atoll
( ) gorge ( ) headland

39. A flat-topped rocky hill located in desert country is a ( ) cape
( ) mesa ( ) dune ( ) mountain

40. An arroyo is smaller than a ( ) chasm ( ) gorge ( ) fissure
( ) precipice

41. Hard-pack ice and snow creeping down the side of a mountain
is called a ( ) mesa ( ) gulf ( ) volcano ( ) glacier

42. A chasm often gets larger and then is called a ( ) fissure
( ) ravine ( ) isthmus ( ) butte

43. A cliff is similar to a (an) ( ) escarpment ( ) precipice
( ) bight ( ) coral reef

44. A canyon is usually deeper than a ( ) ravine ( ) river
( ) coral reef ( ) lagoon

APPENDIX VIII

Name: _____
School: _____
Date: _____

Geographical Terms

Map Test (C)

Please match the numbers on the maps with the following terms. There are more terms than there are numbers, therefore, some terms should be left blank.

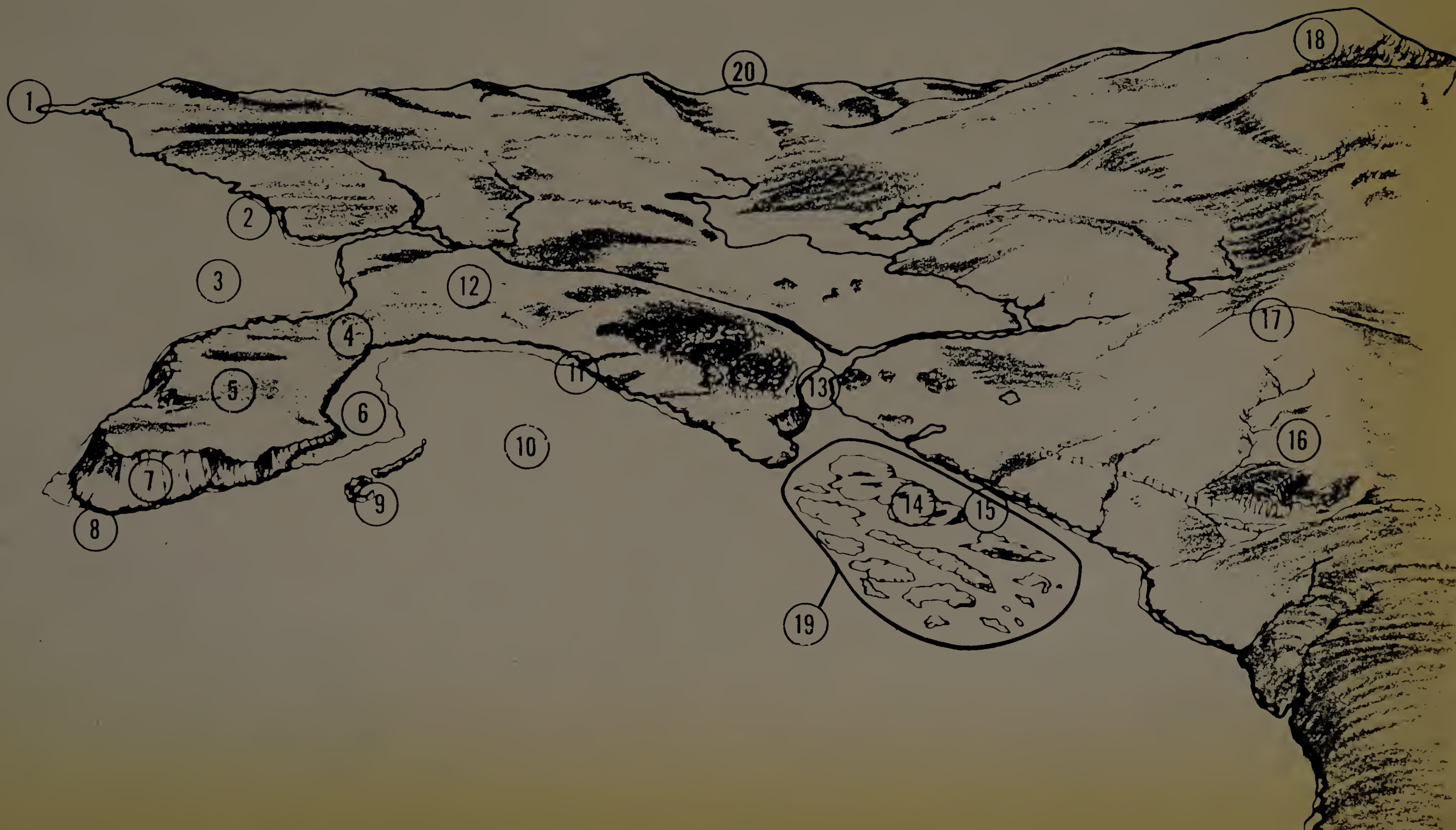
Map One

( ) hill	( ) channel	( ) bay
( ) archipelago	( ) harbor	( ) prairie
( ) mesa	( ) peninsula	( ) coastline
( ) cape	( ) bight	( ) isthmus
( ) cliff	( ) beach	( ) ridge
( ) island	( ) point	( ) mountain
( ) gulf	( ) glacier	( ) knoll
( ) valley	( ) canyon	( ) atoll
		( ) ravine

Map Two

( ) butte	( ) escarpment	( ) gorge
( ) fissure	( ) bight	( ) precipice
( ) arroyo	( ) desert	( ) canyon
( ) peak	( ) mesa	( ) passage
		( ) archipelago

MAP ONE



MAP TWO

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PROBLEM APPROVED BY:

Raymond Ahyman

Ralph Rippert

(Problem Committee)

DATE Jan. 31, 1963